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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,696	06/13/2002	Dimitri Donskoy	7604/21/1	3736

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EXAMINER

SAINT SURIN, JACQUES M

ART UNIT PAPER NUMBER

2856

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/069,696	Applicant(s) DONSKOY ET AL.	
	Examiner Jacques M. Saint-Surin	Art Unit 2856	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 February 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 and 35-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-33 and 35-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This office action is responsive to the amendment of 02/10/05.

### ***Claim Rejections - 35 USC § 102/103***

2. Claims 1-2, 7, 9-10, 11-12, 17, 19-22, 27, 29-33, 38 and 41-43 are rejected under 35 U.S.C. 102(b) as anticipated by Rudd (US Patent 4,554,836) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Russell et al. (US Patent 5,915,050).

Regarding claim 1, Rudd ('836) discloses an electromagnetic wave vibrometer apparatus (laser vibrometer 10, see; Fig. 1 and col. 2, line 24) comprising:

a signal generator (signal generator 22, see: Fig. 1 and col. 2, line 36) for generating an electromagnetic signal;

a modulator for amplitude modulating the electromagnetic signal to produce an amplitude modulated signal (acoustic-optic modulator or Bragg cell 16, see: Fig. 1 and col. 2, line 30) Note that a Bragg cell is known in the art as device for frequency shifting and/or amplitude modulating optical waves, thus, the Bragg cell inherently provide amplitude modulated signal;

a transmitter (transducer 20, see: Fig. 1 and col. 2, lines 36-37) for transmitting the signal at a vibrating object (object surface 28, see: Fig. 1 and col. 3, line 59);

a receiver (photodetector 32, see: Fig. 1 and col. 3, line 40) for receiving a reflected amplitude modulated signal from the vibrating object (28) and col. 4, lines 3-5 discloses the displacement  $d$  is indicative of the amplitude of ultrasonic vibration on surface 28;

a demodulator (demodulator 42 tuned to the acoustic modulation frequency and connected to detector 32 will produce an analog signal E' which is indicative of the actual displacement of vibrating surface 28, see: col. 4, lines 5-9) for demodulating the phase and amplitude modulated signal, a phase demodulator 42; and

a signal processor (visual display and recording device such as oscilloscope or minicomputer, see: col. 4, lines 18-23) for analyzing the vibration waveform of the demodulated signal.

Furthermore, although Rudd discloses an acousto-optic modulator or Brag cell, it does not specifically disclose a modulator for amplitude modulating the electromagnetic signals to produce an amplitude modulated signal. Note that a Brag cell is well known in the art as a device for frequency shifting and/or amplitude modulating optical waves. Russell discloses the Brag cell can operate to shift the frequency of incident light (thereby acting as a switch) or to provide frequency or amplitude modulation of the incident light, see: col. 1, lines 34 and 37. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to utilize a Brag cell in a laser vibrometer or electromagenic vibrometer for providing amplitude modulating signal in a reliable manner as evidenced by Russel et al. (US Patent 5,915,050) col. 1, lines 34 and 37) and Lewis (US Patent 6,545, 762) col. 4, lines 35-37.

Regarding claim 11, it is an apparatus claim that recites the same limitations of the device claim 1. Therefore, it is rejected for the reasons set forth for that claim.

Regarding 21, it is a method claim that recites the steps for performing the functions of claim 1. Therefore, it is rejected for the reasons set forth for that claim.

Regarding claim 32, it is a method claim that recites the steps for performing the functions of claim 1. As discussed above, it is rejected for the reasons set forth for that claim. Furthermore, Rudd discloses a phase demodulator 42 tuned to the acoustic modulation frequency, e.g. 40 MHz and connected to photodetector 32 will produce an analog signal E' which is indicative of the actual displacement of vibrating surface 28, see: col. 4, lines 5-9.

Regarding claims 2, 12, 22 and 33, Rudd discloses a laser beam for use as an optical, ultrasonic transducer, see: col. 1, lines 51-52.

Regarding claims 7, 17, 27 and 38, Rudd discloses a laser signal source 12, see: Fig. 1.

Regarding claims 9, 19, 30 and 42, Rudd discloses a second vibration receiver (photodiode 36, see: Fig. 1) mounted with the first receiver 32 for compensation for unwanted background or coupled vibration.

Regarding claims 10, 20, 31 and 43, Rudd discloses a focusing lens 26 that may be a microscope objective lens and is adjustable along the optical axis means of beam B, see: col. 3, lines 6-10.

Regarding claims 29 and 41, Rudd discloses due to this arrangement, it is straight light, as indicated by the arrows S in Fig. 1, from beam A which actually impinges on the photosensitive region 38 along with beam D, this offset arrangement tends to equalize the intensities of the incident beams and prevents saturation of the photodiode 36, see: col. 3, lines 53-57.

***Claim Rejections - 35 USC § 103***

3. Claims 3-6, 13-16, 24-26 and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rudd (US Patent 4,554,836) in view of Kljuev et al. (US Patent 4,481,825).

Claims 3-4, 13-14, 24 and 35 differ from Rudd by reciting a microwave frequency signal. Kljuev ('825) discloses a microwave generator transmitting microwave energy through an antenna a microwave generator transmitting microwave energy through an antenna system to an object to be the antenna system includes an elliptical mirror having a second focal point in the immediate vicinity of the object being investigated, while the radiator is located in the first focal point close to the mirror, said radiator irradiating the whole surface of said mirror (see: col. 2, lines 11-13 and col. 2, lines 11-23). It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Rudd the microwave of Kljuev as taught above because it would include an optical guidance used for aiming the mirror of the antenna at the object being investigated thereby the combination would be able to provide a device for measurement of vibrations which ensures good resolution and sensitivity when a large-size object to be measured is located at a considerable distance from the device in a reliable manner.

Claims 5-6, 15-16 and 25-26 and 36-37 differ from Rudd by reciting a combination of optical and microwave signals. Kljuev et al. ('825) discloses the optical system 20 comprises an objective 22 located on the axis 21 of the mirror 7 in from of the reflector 10 of the radiator 8 as viewed from the investigated object 5, a light guide

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23 for transmission of the image of the object 5 (see: col. 4, lines 11-15). Kljuev et al. ('825) further discloses the microwave energy of the generator is transmitted through the waveguide system 3 to the radiator 8 irradiating the entire surface of the mirror 7 of the antenna system (see: col. 4, lines 59-62). It would have been obvious to one having ordinary skill in the art at the time of the invention to be motivated to recognize the advantages of utilizing in Rudd et al. the techniques of Kljuev et al. as taught above because the optical guidance of the device provides high accuracy of aiming the device at any section of the object under study thereby, making the above combination more effective and reliable.

4. Claims 8, 18, 28 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rudd (US Patent 4,554,836) in view of Flock et al. (US Patent 5,897,494).

Regarding these claims, although Rudd discloses a laser source, it does not specifically disclose or suggest a LED signal source. Flock et al. ('494) discloses a diode laser source 10, see: Fig. 1. Note that in lightwave transmission systems, light emitting diodes or lasers are used as sources of light and these devices are fabricated from multilayered structures of compounds semiconductors epitaxially grown on a single-crystal substrate. It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Rudd the light emitting diode of Flock et al. as taught above because the LED are used as sources for optical data link applications in which the data rates are less than about 500 megabits per second and the transmission distances do not exceed a few kilometers and moreover, they use less

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power than normal incandescent light bulbs thereby, making the above combination more efficient.

5. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rudd (US Patent 4,554,836) in view of Wang et al. (US Patent 5,495,767).

This claim differs from Rudd by reciting wherein the generated signal is split into first and second signals and the second signal is transmitted to a demodulator for comparing the second signal with the received reflected signal. Wang et al. discloses a beam splitter 14, see: Fig. 1 and col. 2, line 3. It would have been obvious to one having ordinary skill in the art at the time of the invention to include in Rudd the beam splitter of Wang et al. as taught above because the beam splitter is known for reflecting a first portion of a beam and is also common knowledge in the art and are readily commercially available.

### ***Response to Arguments***

6. Applicant's arguments filed Applicant's arguments with respect to claims 1-33 and 35-47 have been considered but are moot in view of the new ground(s) of rejection.

### ***REMARKS***

7. In response to applicant's arguments against the references of Rudd and Russell on page 12 of the remarks, it is not clear why applicant does not refer to any paragraphs discussing the amplitude in the reference. For example, col. 1, lines 56-58, of Rudd discloses "Yet another object of this invention is to measure ultrasonic vibration amplitude". Also, col. 1, lines 67-68 and col. 2, lines 1-2 discloses the amplitude of surface vibration is determined by measuring the phase modulation of



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the shifted beam relative to the reference or unshifted beam. In addition, col. 4, lines 36-39 specifically recites the output of the photoelectric device can be phase and phase/frequency **demodulated to determine the amplitude** and velocity of the ultrasonic vibration on the object surface. Moreover, Russell teaches how the Bragg cell can be used to provide frequency or amplitude modulation of the incident light. Thus, as discussed in the above rejection, it is the examiner's position that the claims are not patentable over the reference of Rudd and Russell since every single element of the claim is disclosed in the Rudd reference and Russell suggests how to use the Bragg cell for providing amplitude modulation.

8. In response to applicant's argument that "Therefore, neither Tudd, nor Russell et al. taken alone and in combination, teach or suggest each element of applicant's claimed" the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

9. In response to Applicant's arguments "Neither Rudd nor Wang or Flock teach or suggest amplitude modulating a signal prior to a transmission of the signal to an object and receiving and demodulating reflected amplitude modulated signals", the Examiner, respectfully, disagrees with Applicant's arguments because as discussed in the above rejection, Rudd in view of Russell clearly teaches the claimed invention as explained.

10. Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view

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of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections

***Conclusion***

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M Saint-Surin whose telephone number is (571) 272-2206. The examiner can normally be reached on Monday-Friday.

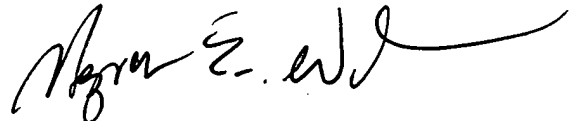
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (703) 305-4705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jacques M. Saint-Surin  
April 30, 2005



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